

Evolution of microstructure and texture in FeCoCr(Al, Mn)_{0.25} magnetic high entropy alloy during thermomechanical processing and its mechanical properties

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Abstract:

Since last decade, HEAs have gained tremendous importance due to its superior mechanical and functional properties when compared to conventional alloys. Among the different functional alloys FCC structured FeCoCr(Al, Mn)_{0.25} alloy possessing high magnetic saturation, high Curie temperature, low coercivity coupled with excellent tensile ductility is introduced recently. In this study, the cast and homogenized FeCoCr(Al, Mn)_{0.25} alloy is thermomechanically processed by cold rolling (93% reduction) and subsequent annealing at varying temperatures (800C, 900C, 1000C and 1100C for 1hr). The effect of thermomechanical processing conditions on the microstructural evolution is characterized by Electron backscattered diffraction (EBSD) studies and correlation is established between mechanical properties and evolution of microstructure and crystallographic texture.

Key words:

Magnetic high entropy alloy, thermomechanical processing, electron backscattered diffraction (EBSD), microstructure and texture